| Desktop Apps |
|---|
| Operating System |
| Hardware |

**1990**

## FIG. 1A

| Web Apps & Components |
|---|
| Application Server |
| VM |
| Operating System |
| Hardware |

**Today**

## FIG. 1B

WAS
200

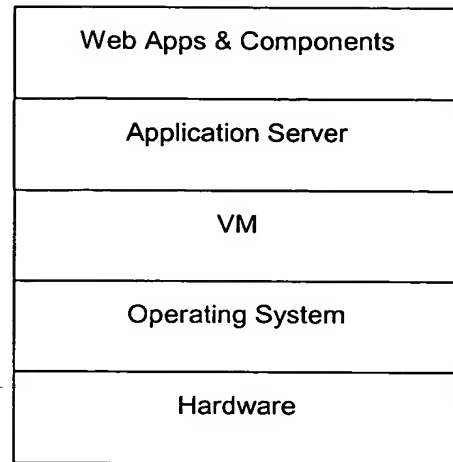206  206
206  206  206

HTTP Server
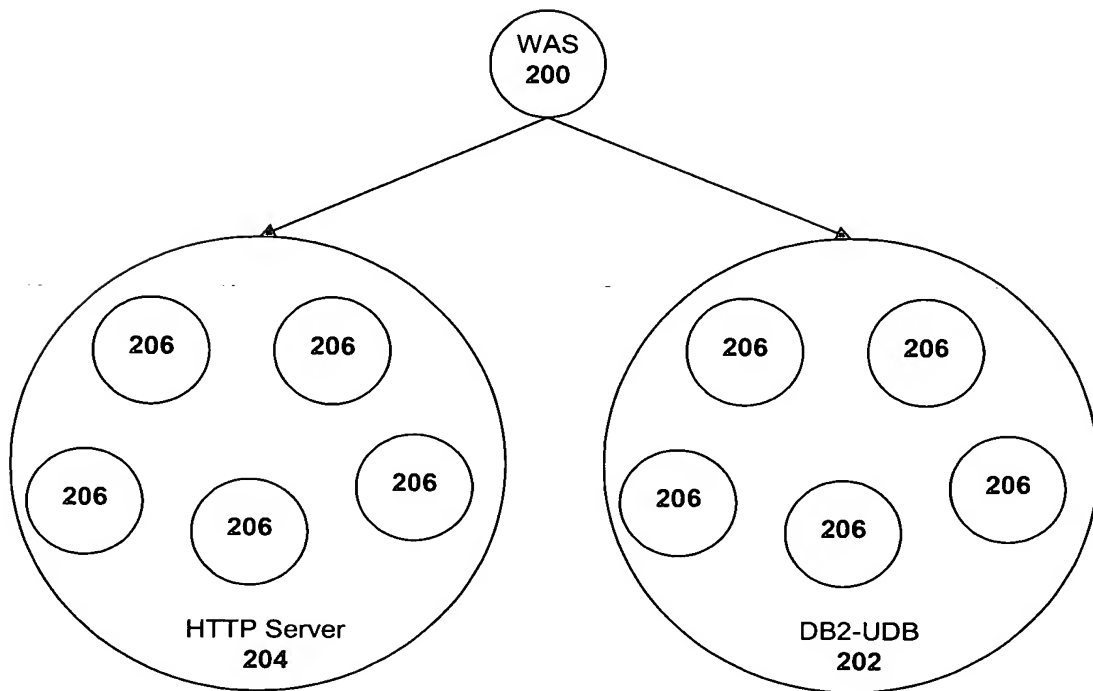204

206  206
206  206  206

DB2-UDB
202

## FIG. 2

```
SystemOut     O ADMA6010I: The tasks are
[com.ibm.ws.management.application.task.ExtractionTask,
com.ibm.ws.management.application.task.CompileJspTask,
com.ibm.ws.management.application.task.ConfigureTask,
com.ibm.ws.management.application.task.BackupAppTask]
[4/7/03 10:31:46:171 EDT] 3ccab45e SystemOut     O ADMA6013I: Extract application binaries
at C:\DOCUME~1\sadtler\LOCALS~1\Temp\app_f4688a2b10\ear
[4/7/03 10:31:47:522 EDT] 3ccab45e SystemOut     O Compiling jsps in Database_Testing.war
[4/7/03 10:31:47:522 EDT] 3ccab45e SystemOut     O Invoking compilation ..
[4/7/03 10:31:49:746 EDT] 3ccab45e WebGroup      I SRVE0180I: [OnlineCatalog]
[/OnlineCatalog] [Servlet.LOG]:
[4/7/03 10:31:50:146 EDT] 3ccab45e WebGroup      I SRVE0180I: [OnlineCatalog]
[/OnlineCatalog] [Servlet.LOG]:
[4/7/03 10:31:53:131 EDT] 3ccab45e SystemOut     O Errors compiling jsps in
C:\DOCUME~1\sadtler\LOCALS~1\Temp\app_f4688a2b10\ear\Database_Testing.war
[4/7/03 10:31:53:131 EDT] 3ccab45e SystemOut     O Return code from jsp-compilation is: 1
[4/7/03 10:31:54:302 EDT] 3ccab45e SystemOut     O Exception in jsp compile:
com.ibm.websphere.management.exception.AdminException: ADMA0021E: Error in compiling jsps -
Database_Testing.war (rc=1)
[4/7/03 10:31:54:703 EDT] 3ccab45e SystemOut     O ADMA6012I: Exception in run
com.ibm.websphere.management.exception.AdminException: ADMA0021E: Error in compiling jsps -
Database_Testing.war (rc=1)
[4/7/03 10:31:54:703 EDT] 3ccab45e SystemOut     O Exception:
com.ibm.websphere.management.exception.AdminException: ADMA0021E: Error in compiling jsps -
Database_Testing.war (rc=1)
[4/7/03 10:31:54:703 EDT] 3ccab45e SystemOut     O ADMA6011I: Deleting directory tree
C:\DOCUME~1\sadtler\LOCALS~1\Temp\app_f4688a2b10
```
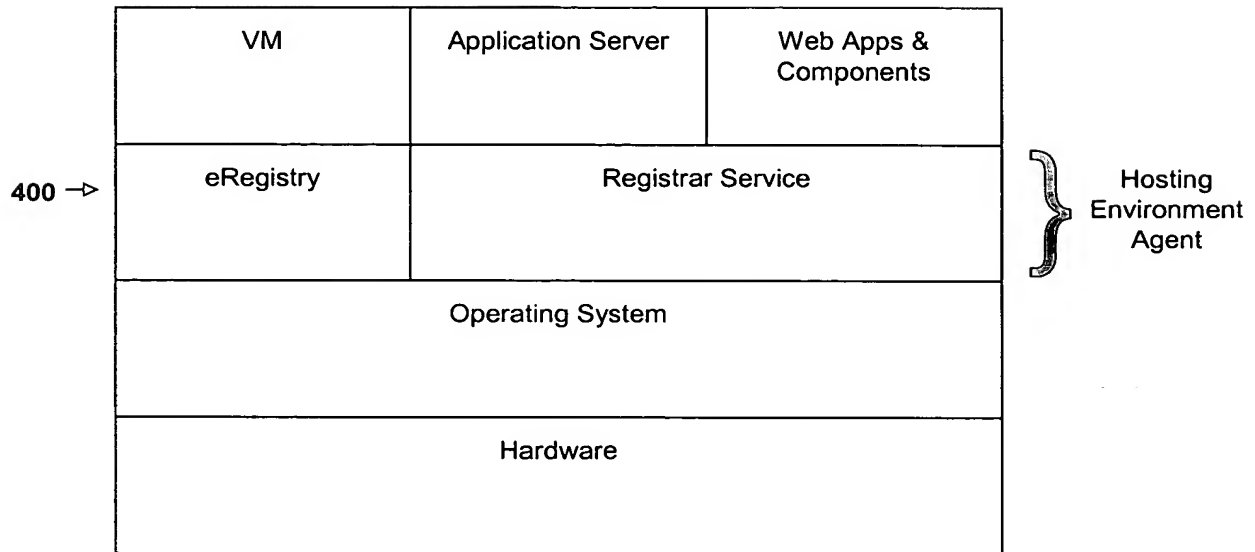
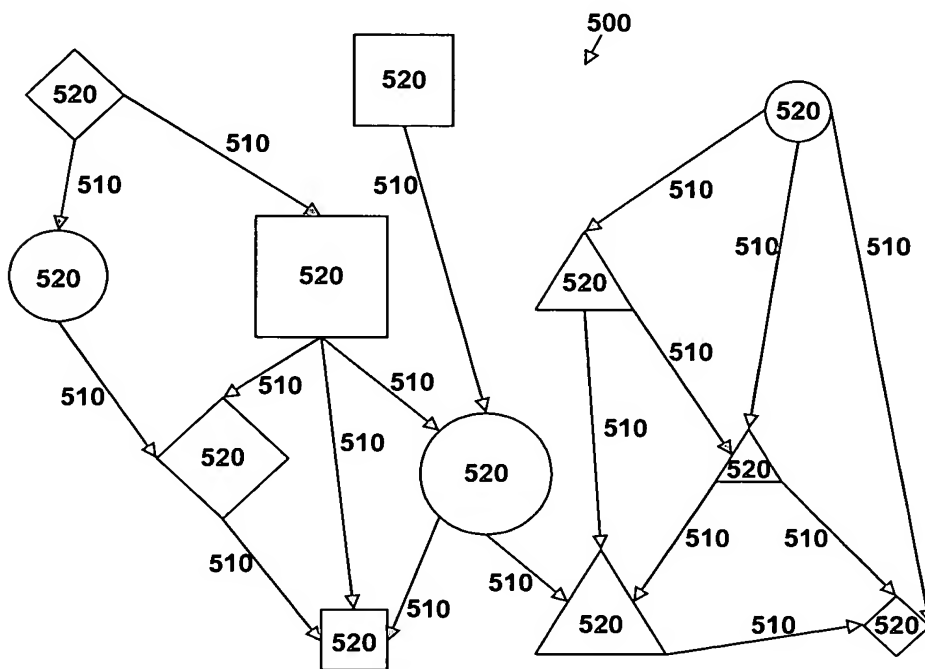| VM | Application Server | Web Apps & Components |
|----|-------------------|----------------------|
| eRegistry | Registrar Service | |
| Operating System | | |
| Hardware | | |

400 →

} Hosting Environment Agent

FIG. 4

500

FIG. 5

1    520     520     520

2    520     520     520

3    520     520     520

4    520     520     520

**FIG. 6**

5
WAS
700

3   4   2

1   1

HTTP Server
720

3   2
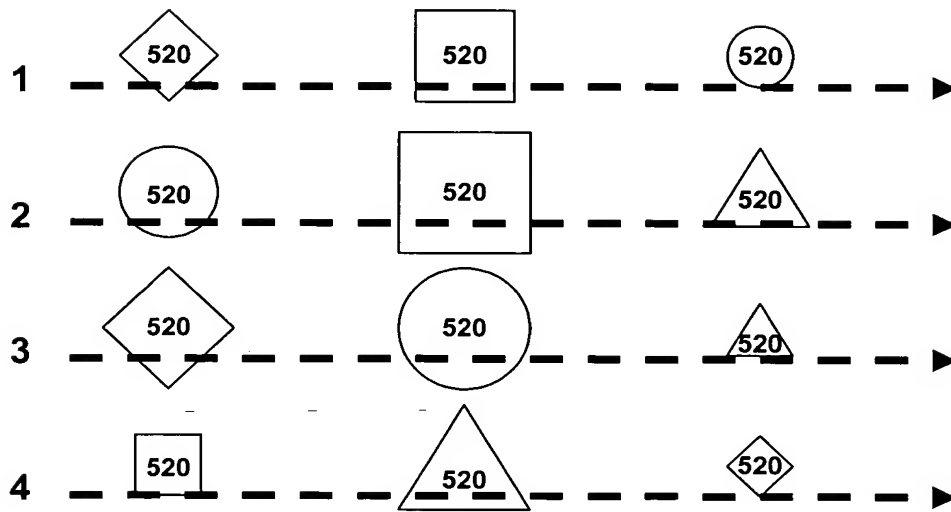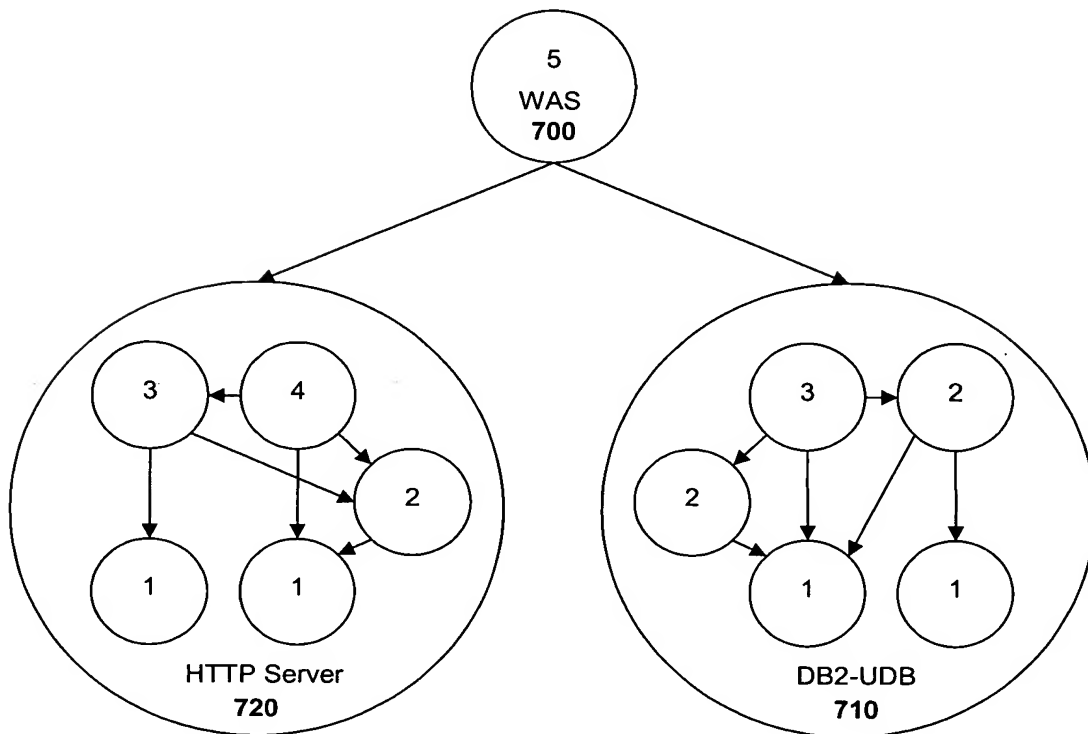
2

1   1

DB2-UDB
710

**FIG. 7**

**INPUT:** a DAG representing the semantic model of the software
components
**OUTPUT:** void
**do while**(there are nodes unmarked)
       // a leaf node is a node with incoming edges only
       **if** (there are leaf node)
              Nodes_to_install_in_parallel ← leaf nodes
       **else**
              Nodes_to_install_in_parallel ← chose randomly a node
              at the lowest level in the DAG


       Install(Nodes_to_install_in_parallel)

       Delete the install nodes and their incoming edges ()
**enddo**

**FIG. 8**

```
-- WAS
      -- IBM HTTP SERVER
             + CHECKS
             + DEPLOY
             + SETUP
             + CLEAN UP

      + IBM DB2 UDB

      -- APPLICATION SERVER
             + WAS
             + SERVER PLUG-INS
             + APPLICATION ASSEMBLY AND DEPLOYMENT TOOL
             + DEPLOYMENT TOOL
             + APPLICATION SERVER EXAMPLES
             + MESSAGE DRIVEN BEAN SAMPLES
             + ANT UTILITIES

      -- ADMINISTRATIVE TOOLS
             + ADMINISTRATION CONSOLE
             + ADMIN SCRIPTING
```

**FIG. 9A**

```
-- WAS
    -- IBM HTTP SERVER
        -- CHECKS
            -- Check memory  OK
            -- Check Disk Space OK
            -- Check CPU OK
            -- Check Windows OK
            -- Check Windows Patches OK
        -- DEPLOY
            -- Create Directory ${install.path}/IBM HTTP Server
            -- Create Directory ${install.path}/IBM HTTP Server/tmp
            -- Create Directory ${install.path}/IBM HTTP Server/bin
            -- Create Directory ${install.path}/IBM HTTP Server/register
            -- Create Directory ${install.path}/IBM HTTP Server/license
            -- Create Directory ${install.path}/IBM HTTP Server/samples
            -- Copy File ${install.from}/setup/server.zip
                            to ${install.path}/IBM HTTP Server/tmp

            ...............

        -- SETUP
            -- Extract ${install.path}/IBM HTTP Server/tmp/server.zip
            -- Run ${install.path}/ IBM HTTP Server/tmp/setup/install.exe
            ...............
        -- CLEAN UP
            ...............


    -- IBM DB2 UDB
            ...............


    -- APPLICATION SERVER
        -- WAS
            ...............
        -- SERVER PLUG-INS
            ...............
        -- APPLICATION ASSEMBLY AND DEPLOYMENT TOOL
            ...............
        -- DEPLOYMENT TOOL
            ...............
        -- APPLICATION SERVER EXAMPLES
            ...............
        -- MESSAGE DRIVEN BEAN SAMPLES
            ...............
        -- ANT UTILITIES
            ...............

    -- ADMINISTRATIVE TOOLS
        -- ADMINISTRATION CONSOLE
            ...............
        -- ADMIN SCRIPTING
            ...............
```

FIG. 9B